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JUNE 1947 SESSION OF THE DEPARTMENT OF CHEMICAL SCIENCES

The opening meeting of the Department of Chemical Sciences in Leningrad was dedicated to the 25th anniversary of the Radium Institute, Academy of Sciences USSR.

The session was opened by Academician A. N. Kheseyanov, Secretary of the Department of Chemical Sciences, who noted the outstanding achievements of the Radium Institute.

A report on the accomplishments of the Radium Institute for the past 25 years was submitted by I. E. Starik, Deputy Director of the Institute, and Corresponding Member, Academy of Sciences USSR.

After the report, the order of the Presidium of the Supreme Soviet of the USSR awarding orders and medals to 28 workers of the Reftum Institute was read. The Order of Lenin was awarded to Academician V. G. Khlopov, Director of the Institute. The Order of the Red Banner of Labor was awarded to Academician P. I. Lukitskiy, and to L. A. Nikitin and I. E. Starik, Corresponding Members, Academy of Sciences USSR. The Order of the Red Star was awarded to A. A. Grinkov, Corresponding Member, Academy of Sciences USSR, and to M. G. Meshcherskyakov, M. A. Pasvik-Khlopina and A. Kh. Ratner, Candidates in Chemical Sciences. Eight workers of the Institute were awarded the Order "Badge of Honor," and 12 workers of the Institute were given medals "For Labor Valor," and "For Labor Distinction."

Following this, the order of the Presiding Council of the Academy of Sciences USSR awarding monetary prizes to workers of the Institute was announced.

The orders and medals were awarded the winners by K. V. Bessov, Vice-chairman of the Lensovet.

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At the opening meeting, greetings were read from Academician S. I. Vavilov, President of the Academy of Sciences USSR; the Presidium of the Academy of Sciences USSR; the Department of Chemical Sciences, Academy of Sciences USSR; the Moscow and Leningrad Universities; the Ministry of Geology; the Institute of General and Inorganic Chemistry, Academy of Sciences USSR; the State Optical Institute; the Ministry of Health; and a number of other institutes.

Greetings from I. V. Stalin were enthusiastically received. At subsequent meetings of the session, ten scientific reports were heard.

Academician A. N. Nesmeyanov, in his report, "Chemistry of Quasi-Complex Compounds and Problems of Tautomerism of Metallo-organic Compounds," reported on the types of metallo-organic compounds which were obtained and studied by him and his students, R. Kh. Freydlin and A. E. Borisov, and which compounds were obtained either by direct addition of metallic halide to acetylene, or from the subsequent reaction of the replacement of such an addition by other metallic halides. Compounds studied were chlorovinyl metallo-organic compounds having cis- and trans-structures. All these substances, which have dual chemical reactions, show on the one hand normal reactions similar to beta-chlorovinyl metallo-organic substances, while on the other hand they imitate the behavior of complex compounds, which actually they are not. Such compounds are defined by Nesmeyanov as quasi-complex.

The dual behavior of quasi-complex metallo-organic compounds, in Nesmeyanov's opinion, is closely related to the tautomeric behavior of metallic derivatives of ketonols, lactim-lactams, and other related systems, and can be explained by hyperconjugation and not by tautomeric equilibrium.

Professor S. A. Shchukarev, in his report, "Periodic System of Isotopes and Atomic Weights," analyzed the regularities observed in the law of proportional increase of atomic weights from hydrogen to curium, and came to the conclusion that the atomic weights, like other properties of the elements, are periodic functions of the specific atomic number of the elements. The periodicity is expressed as a regular cycle of regions of concentration and thinning of points on the curve representing a discontinuous function.

A. F. Kapustinakiy, Corresponding Member, Academy of Sciences USSR, in his report, "Heat Necessary for the Formation of Carbonates of the Second Group of Elements From Beryllium to Radium," discussed the results of experiments on the dissociation of beryllium carbonate from hydroxy and carbonic acids, and the heat of formation of a given compound, calculated from the equilibrium constants of this reaction, and confirmed by the calorimetric method (by the heat of solution). The results obtained make it possible to extrapolate the corresponding values for radium compounds.

A. I. Brodskiy, Corresponding Member, Academy of Sciences USSR, submitted a report on "Regrouping of Hydrogen in Phenols," prepared with the assistance of G. F. Miklukhin, I. P. Tragerov, and I. I. Kukhtenko.

The results of experiments show that there is an exchange of hydrogen atoms between hydroxyl and the phenol nuclei which occurs in the reaction of two phenol molecules, for which the most likely mechanism is Ingold's electrophilic substitution with a formation of an intermediate complex.

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Academician A. N. Frumkin, in his report, "Physicochemical Phenomena in Boundary Layers of Moving Fluids," described the basic factors of the speed of a moving fluid at its boundary with a solid substance, with a liquid, and a gas; described several phenomena relating hereto; and presented a theory developed by him and V. G. Levich regarding these phenomena, which can be observed for various above-mentioned conditions of a surface of separation.

Frumkin then presented a number of conclusions from this theory, which had been tested and confirmed in experimental work by I. A. Bagotskaya and T. A. Kryukova. The theory which was developed may be important to the understanding of a number of phenomena in the field of polarographic analysis, stability of foams and emulsions, properties of certain colloid systems, etc.

The report of I. I. Zhukov, Corresponding Member, Academy of Sciences USSR, "Electrokinetic Properties of Capillary Systems," was devoted to experimental and theoretical study of the electrochemical behavior of diaphragms. His report included data on the  $\zeta$ -potential, change of transference numbers, and surface conductivity to the structure of diaphragms. It demonstrated the relationship between system resistance and location of the diaphragm between electrodes and the passage of current, and presented data on the method of preparing diaphragms with geometrically correct pores.

S. Z. Roginskiy, Corresponding Member, Academy of Sciences USSR, in his report, "Differential Isotopic Method of Studying Adsorption," pointed out several possible solutions of the problem of direct demarcation of phenomena of surface heterogeneity and repulsion forces, essential in explaining the anomalies existing during adsorption of gas and solutes with small amounts of priming. With the aid of the differential isotopic method and its possible variations, the adsorption of hydrogen on activated carbon was studied.

Roginskiy was of the opinion that it is advisable, for the study of surfaces by the differential isotopic method, to use molecules containing radioactive isotopes. Using the differential isotopic method in conjunction with the study of kinetics of reactions in a layer, one may hope to ascertain clearly what parts of the surface actually conduct a catalytic process under different conditions.

A. P. Vinogradov, Corresponding Member, Academy of Sciences USSR, in his report, "Isotopic Composition of Oxygen of Various Origins," described the results of experiments in determining the isotopic composition of oxygen in water, air, photosynthetic oxygen, carbonic acid oxygen, oxygen of carbonates, certain minerals, and rocks.

On the basis of the isotopic composition of photosynthetic oxygen, it was proved that a dehydrogenation of the water and elimination of its oxygen occurs in photosynthesis, and not decarboxylation of carbonic acid to free oxygen, as it was formerly assumed.

The idea of subaqueous and subaerial genesis of minerals is expressed on the basis of the established difference in the isotopic composition of oxygen in minerals and rocks.

The report of Ya. K. Syrkin, Corresponding Member, Academy of Sciences USSR, and D. N. Shigorin described experimental results of acetylacetone and acetoacetic ester with the aid of heavy hydrogen on ketonol tautomerism.

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Acetylacetone containing deuterium in the methylene group was obtained. It was shown that heavy hydrogen is isomerized with greater difficulty than light hydrogen. Experiments were made by Raman's spectroscopic method.

At the final meeting, Academician S. I. Vol'fkovich, chairman, noted the great success of the session which attracted a very large number of enthusiastic participants in scientific debates. Some of the reports have opened a new page in their respective fields of chemical science and have raised problems of basic importance. Five of the reports were devoted to isotopes and their application in studying the mechanism of chemical reactions.

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